NCERT QUESTION WITH SOLUTION

1. Match items in Column-I with the items in Column-II.

Column-I (Type of force)		Column-II (Example)	
(A)	Muscular force	(p)	A cricket ball stopping on its own just before touching the boundary line
(B)	Magnetic force	(q)	A child lifting a school bag
(C)	Frictional force	(r)	A fruit falling from a tree
(D)	Gravitational force	(s)	Balloon rubbed on woollen cloth attracting hair strands
(E)	Electrostatic force	(t)	A compass needle pointing North

Solution

(A → q); (B → t); (C → p); (D → r); (E → t)

2. State whether the following statements are True or False.

(i) A force is always required to change the speed of motion of an object.

(ii) Due to friction, the speed of the ball rolling on a flat ground increases.

(iii) There is no force between two charged objects placed at a small distance apart.

Solution

(i) **True**

A force is always required to change the speed of motion of an object.

(ii) **False**

Due to friction, the speed of the ball rolling on a flat ground decrease.

(iii) **False**

Electrostatic force acts between charged objects – they may attract or repel.

3. Two balloons rubbed with a woollen cloth are brought near each other. What would happen and why?

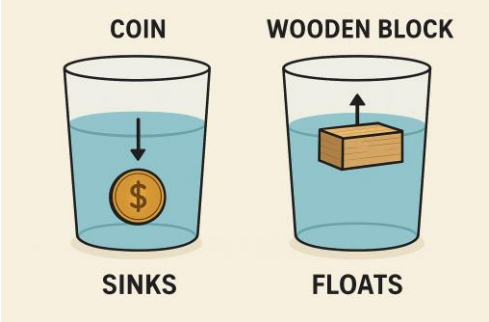
Solution

When two balloons are rubbed with a woollen cloth and then brought near each other, they will repel each other. This happens because rubbing transfers electrons from the wool to the balloons, making both balloons negatively charged. Since like charges repel each other, the two balloons push away from one another.

4. When you drop a coin in a glass of water, it sinks, but when you place a bigger wooden block in water, it floats. Explain.

Solution

It's all about being heavy for your size.A coin is very heavy for its small size. It's so heavy that the water can't hold it up, so it sinks. The wooden block is very light for its big size. Because it's so spread out and light, the water can easily hold it up, so it floats.



5. If a ball is thrown upwards, it slows down, stops momentarily, and then falls back to the ground. Name the forces acting on the ball and specify their directions.

(i) During its upward motion

(ii) During its downward motion

(iii) At its topmost position

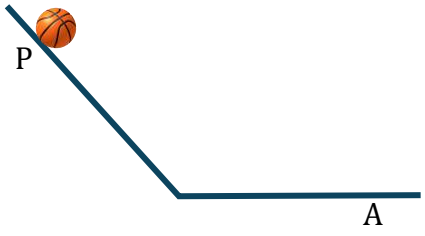
Solution

(i) During its upward motion:
Force of gravity acts downwards and air resistance (friction) acts downwards to oppose the upward motion.

(ii) During its downward motion:
Force of gravity still acts downwards and air resistance (friction) acts upwards to oppose the downward motion.

(iii) At its topmost position: The velocity of the ball is zero for a moment so, air resistance is zero but the force of gravity still acts downwards, pulling it back toward Earth.

6. A ball is released from the point P and moves along an inclined plane and then along a horizontal surface as shown in the Figure It comes to stop at the point A on the horizontal surface. Think of a way so that when the ball is released from the same point P, it stops (i) before the point A(ii) after crossing the point A.



Solution

When the ball rolls down from point P, it gets some energy and keeps moving forward on the flat surface until friction (the rubbing force between the ball and the ground) makes it stop at point A.

(i) To make the ball stop before A, We need to increase friction.
For example, put sand, rough cloth, or make the floor rough. Then the ball will lose energy faster and stop earlier, before A.

(ii) To make the ball stop after crossing A, We need to reduce friction.
For example, polish the floor, put oil, or make it smooth. Then the ball will keep rolling longer and stop after A.

7. Why do we sometimes slip on smooth surfaces like ice or polished floors? Explain

Solution

We slip on smooth surfaces due to a lack of friction, which is the gripping force between your shoes and the ground. When you walk, your feet push backward, and friction pushes you forward.
Smooth surfaces like polished floors or ice have very few microscopic bumps for your shoes to grip thus reduces friction causing you to slip.

8. Is any force being applied to an object in a non-uniform motion?

Solution

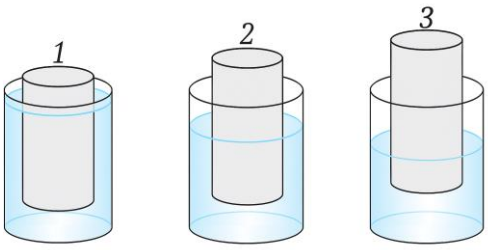
Yes, a force is definitely being applied. Non-uniform motion means an object is either speeding up, slowing down, or changing direction. Think of a car: to go faster, you press the gas pedal (applying more force). To slow down, you hit the brakes (applying a braking force). To turn, you use the steering wheel to apply a force that changes the car's direction. So, any change from moving at a steady speed in a straight line requires a force.

9. The weight of an object on the Moon becomes one-sixth of its weight on the Earth. What causes this change? Does the mass of the object also become one-sixth of its mass on the Earth?

Solution

This change is caused by a difference in gravity. The Moon is much smaller than the Earth, so its gravitational pull is far weaker—only about one-sixth as strong. Since weight is the measure of gravity's pull on an object, your weight on the Moon becomes one-sixth of what it is on Earth. No, the mass of the object does not change. Mass is the amount of matter, or "stuff," in an object, and that amount stays the same everywhere.

10. Three objects 1, 2, and 3 of the same size and shape but made of different materials are placed in the water They dip to different depths as shown in Figure .If the weights of the three objects 1, 2, and 3 are w_1, w_2, and w_3, respectively, then



(i) $w_1 = w_2 = w_3$

(ii) $w_1 > w_2 > w_3$

(iii) $w_2 > w_3 > w_1$

(iv) $w_3 > w_1 > w_2$

Solution

The correct answer is (ii) $w_1 > w_2 > w_3$.

For any object to float, the water has to push it up with a force that exactly equals the object's own weight. This upward push, called buoyant force, is equal to the weight of the water that the object pushes out of its way.

Object 1 sinks the deepest, meaning it has to push aside the most water to float. This means it needs the biggest upward push from the water, so it must be the heaviest (w_1). Object 3 displaces the least water, so it's the lightest (w_3).